A STUDY OF THE PHYSICAL HEALTH PRACTICE OF UNITED STATES AIR FORCE CAPTAINS

THESIS

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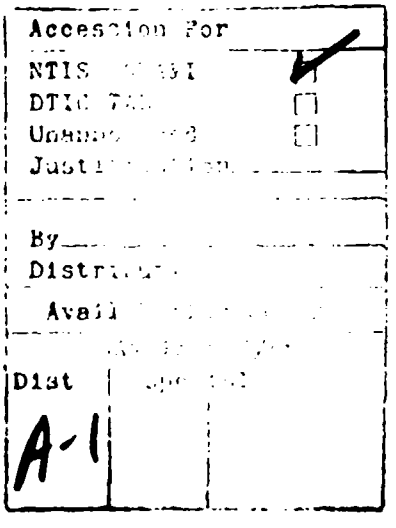

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THESIS

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

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September 1986

Acknowledgments

Contributions from many individuals have made this thesis effort possible. I am especially indebted to my thesis advisor, Dr. William Mauer, for his expertise, patience and continued support throughout the research process. I also wish to thank Dr. Harry Wetzler of the Department of Defense Medical Examination Review Board for providing the 1977 health survey data and his insight into the Air Force health promotions area. Finally, I wish to thank my wife Susan and my son Paul for their continued understanding and support.

Bret A. Hyde

Table of Contents

Page

Acknowledgments.....ii

List of Tables.....v

Abstract.....vi

I. Introduction.....1

General Issue.....1
Specific Problem.....1
Hypotheses and Investigative Questions.....1
Scope.....2
Background.....3
Significant Health Practices.....4
Air Force Health Practices.....5
Health Promotions.....6
Corporate Health Programs.....7
Air Force Health Programs.....8
Wright-Patterson Air Force
Base Health Promotions.....10
Behavioral Studies.....12
Summary.....14

II. Methodology.....15

Overview.....15
Development of Physical Health Measures.....15
Survey Instrument.....15
General.....15
Survey Structure.....17
Population and Sampling.....17
Distribution.....18
Statistical Test.....19
Assumptions and Limitations.....20
Assumptions.....20
Limitations.....20

III. Findings and Analysis.....22

General.....22
Survey Description.....22
Recordings of Findings.....25
Demographic Results.....25
Statistical Tests of Health Practices....25
Other Statistical Tests.....32
Descriptive Analysis.....34
Weight.....34

Breakfast.....35
Snacking.....35
Nutrition.....36
Sleep.....36
Smoking.....36
Alcohol.....38
Exercise.....38
CARE.....39
Summary.....40

IV. Discussion and Recommendations.....41

Significance of Results.....41
Hypothesis 1.....41
Hypothesis 2.....44
Recommendations for Further Research.....48
Summary.....49

Appendix A: Physical Health Survey.....51

Appendix B. Survey Response Frequencies.....60

Appendix C: Summary of Survey Comments.....74

Appendix D: Summary of Gamma Statistics.....77

Bibliography.....78

Vita.....81

List of Tables

Table		Page
I.	Demographic Data	26
II.	Definition of K-S Test Symbols	27
III.	Sample Two-tailed K-S Test Calculations (Question 24)	28
IV.	Summary of Two-tailed K-S Tests for Health Practices	29
V.	Sample One-tailed K-S Test Calculations (Question 24)	31
VI.	Summary of One-tailed K-S Tests for Health Practices	32
VII.	Summary of Two-tailed K-S Tests for Other Questions of Interest	33
VIII.	Summary of One-tailed K-S Tests for Other Questions of Interest	33
IX.	Changes in Physical Health Practices	42
X.	Primary Reasons for Positive Changes in Health Practices	45

Abstract

The purpose of this ~~study~~ is to investigate positive changes in the physical health practices of Wright-Patterson Air Force Base captains. Additionally, the reasons for those changes and their relationship to the Air Force Health promotions program is investigated.

The study uses a survey to measure seven physical health practices of a probability sample of captains assigned to Wright-Patterson AFB for comparison to previously collected Air Force health data.

Significant positive changes occurred in the smoking habits, alcohol consumption and physical exercise habits of the sample. Negative changes were evident in the amount of weight gained since entering active duty and sleep habits. No change was present for frequency of eating breakfast or between meals.

Familiarity of the sample with the current health promotion programs such as the Coronary Artery Risk Evaluation (CARE) program and smoking cessation classes are discussed in terms of success in reaching the population and motivating positive changes in behavior. Also, the reasons given for making positive changes are investigated to show the effectiveness of the health promotions effort.

A STUDY OF THE PHYSICAL HEALTH PRACTICES OF UNITED STATES AIR FORCE CAPTAINS

I. Introduction

General Issue

The Air Force health promotions effort is aimed at improving the health practices of Air Force personnel. The measure of success of any health promotions effort is the improvement of the health practices of the target population. To measure the Air Force's success, we must know if the health practices of Air Force personnel have changed and, if so, what caused these changes.

Specific Problem

This research project investigates the current health practices of Air Force captains. Additionally, it focuses on the changes in health practices and why the changes took place. Specifically, are Air Force captains improving their personal health practices and, if so, is the Air Force health promotions program a key cause of these improvements?

Hypotheses and Investigative Questions

This research project attempts to support the following hypothesis:

1. Significant positive changes in the physical health practices of Air Force personnel have occurred since

the Air Force Military Personnel Center administered the 1977 Health Survey.

2. The Air Force health promotions effort is a major force in promoting positive changes in health practices.

The following investigative questions are addressed to support or reject the stated hypothesis.

1. What are the current health practices of Air Force captains in the following areas:

a) body weight
b) eating breakfast
c) between meal snacking
d) sleeping habits
e) smoking habits
f) alcohol consumption
g) exercise

2. What changes, if any, have been made in the above health practices of Air Force captains since entering active duty?

3. If changes in health practices are evident, what is the motivation behind the changes?

Scope

This research project focuses on seven health practices of Air Force officer personnel with the rank of captain. The study consists of a sample of Air Force captains assigned to Wright-Patterson Air Force Base, Ohio. The rank of captain is selected since it is the largest single rank at Wright-Patterson with approximately 2500 assigned. Also the rank of captain is one of the largest samples taken in the 1977 health survey being used for comparison.

The project will investigate only physical health practices. These physical health practices are broken down

into seven categories. The categories are body weight, eating breakfast, eating between meals, sleeping habits, smoking habits, alcohol consumption and exercise in leisure time. These categories deal only with the physiological aspects of health. Psychological aspects such as stress management, personal affairs management and environmental awareness are not considered.

Physical health practices of Air Force captains as determined by this study are compared to previously collected Air Force health data. Motivation for changes of health practices are also investigated.

Background

Never in our history have the benefits of exercise, proper nutrition and an overall healthy lifestyle been so widely publicized. The detriments of smoking, too much alcohol, and a sedentary lifestyle are equally popular topics. Advertising in newspapers, magazines and on television focus on the desire of the American public to look, feel, and be healthy. All of the attention given to health is not by coincidence. In 1979, Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention reported that an analysis of the 10 leading causes of death suggested half of U.S. mortality in 1976 was due to unhealthy behavior or lifestyle (1:9). A great deal of research has been conducted since to investigate the connection, if any, between lifestyle and good health.

Significant Health Practices. In 1972, N.B. Belloc and L. Breslow reported a positive relationship between seven health practices and physical health status (2:420). Their study was conducted using data collected by the Human Population Laboratory of Alameda County, California in 1965. The seven health practices used were hours of sleep, physical exercise in leisure time, alcohol and cigarette consumption, obesity, eating between meals, and having regular breakfast.

In 1983, W. Reed supported Belloc's findings in an independent study of 3,300 suburban St. Louis county employees (3). Reed surveyed 450 individuals and found that a positive association exists between practicing what are considered good health habits and a higher level of physical health (3:227). Reed's study did not show a positive association between alcohol consumption and good health.

In a 5 1/2 year follow-on study to his original work, Belloc showed a positive relationship between the same seven health practices and longevity (4). In 1980 Breslow and Enstrom supported Belloc's findings in a 9 1/2 year follow-on study using the same methodology (5).

These same seven health practices have also been investigated for a positive association to future health. In 1980, Wiley and Camacho reported

> the existence of an association between five health practices measured in 1965 and health status 9 years later in a large sample of individuals drawn from a socially and economi-

cally diverse urban population (6:21).

Eating between meals and eating breakfast are the two practices that did not show a positive association.

Through the years, researchers have built a strong case for using the seven health practices identified by Belloc as representative measures of good health.

Air Force Health Practices. Research into the physical health status of Air Force military personnel is very limited. According to Dr. Harry Wetzler of the Department of Defense Medical Examination Review Board, a survey titled "Health Survey" conducted in 1977 by the Air Force Military Personnel Center (MPC) is the only comprehensive investigation of the health status of Air Force military personnel. The survey involved a randomized block design on military rank with a total of 6675 responses from an unknown number of surveys distributed.

The 1977 survey addressed a variety of fitness and health areas including the seven health practices identified by Belloc and Breslow in 1971. High level Air Force leaders used the survey results to assess the health status of the Air Force as a whole. Additionally, Dr. Wetzler and Dr. David Cruess used the results of the survey to compare the health practices of Air Force military personnel to the U.S. adult population based on the Health Practices Supplement to the National Center for Statistics Health Interview Survey (7). No longitudinal studies of the health practices of Air Force military personnel have been accomplished.

Health Promotions. Modification of health practices is a difficult undertaking. People have a natural resistance to change. Health promotions however continue to come into being in hopes of improving the well being of individuals. The term health promotions as used in this study encompasses any activity directed toward community and individuals to promote lifestyles that maintain and enhance health (8:202). In parallel, the goal of health promotions personnel is to motivate changes in lifestyle associated with good health.

Health prcmotions takes many forms, but whether administered by a physician (9), a government agency, or private organizations, the objective is education of the individual on the benefits or detriments of specific health practices.

In 1964, the Surgeon General warned of the hazards of cigarette smoking and the American Heart Association (AHA) recommended a general change in the national diet to reduced dietary cholesterol and saturated fat (10:649). In the same year, the first ever decline in the age-specific coronary mortality rate in the United States was noted (10:649). A longer view of 30 years shows the mortality rate due to heart and circulatory diseases decreasing by more than 30 per cent (11:760).

Health promotions specialists claim the reduced mortality is due to the Surgeon General's and AHA's announcements and resulting changes in the American lifestyle (11:760).

Others claim credit is due to cardiopulmonary resuscitatio (CPR) procedures, improved intensive care units, advanced surgical techniques, and better emergency medical services (11:760). Consequently, the actual causes of changes in physical health practices and consequently physical health are difficult to determine.

Corporate Health Programs. Some of the most successful cases of modified health practices occur in the corporate world. Many corporations recognize the benefits of healthy employees in both reduced medical expenses and increased productivity. In 1974, a small group of 25 worksite fitness directors formed the American Association of Fitness Directors in Business (AAFDB). By 1985, the organization has grown to more than 300 members in 12 nations (12). This groups goal is to promote fitness in the workplace. In 1982, more than 400 companies in the United States have health or fitness programs (13) and the number is growing. Many large corporations and government organizations have followed the lead of the National Cash Register Company when it started the first corporate fitness program in 1894.

The Tenneco Corporation, based in Houston, Texas, has a Health and Fitness Program which produced convincing evidence that people who exercise regularly miss fewer days of work because of illness and consistently rank higher in supervisor's productivity ratings (14:24). Similar studies conducted in the Soviet Union (15:4) and Canada (16) show

similar results; namely, employees that exercise save their employers time and money.

Programs like these are based primarily on physical exercise and do not focus on other health aspects such as smoking, sleep, nutrition and obesity. Beginning in 1968, the National Aeronautic and Space Administration (NASA) conducted a study in cooperation with the Heart Disease and Stroke Control Program of the U.S. Public Health Service to demonstrate the economic benefits of a corporate exercise program. After one year, results of a survey given to those who adhered to the program showed:

- 50 per cent reported better job performance and better attitudes towards their work
- 93 per cent said they felt better about their personal health
- 89 per cent reported improved stamina
- Over 60 per cent reported a loss of weight
- 50 per cent said they felt less stress and tension
- 40 per cent said they were paying more attention to their diet
- 30 per cent reported sounder sleep
- 15 per cent said they quit or cut down on smoking (14:4)

The perceptions of those who adhered to the program reflect perceived changes in their health practices in more than the area of exercise.

Air Force Health Programs. The Air Force health promotions effort has gained momentum since its inception in 1977 with the recent signing of a new Department of Defense Directive on health promotion.

The health promotion effort in the Air Force formally began in April 1977 when the Health Education Division

(MSCE) of the School of Health Care Sciences was established. The Health Education Division functions as the central office of the United States Air Force Health Education Program (USAFHEP) which was established by the Surgeon General of the Air Force in July 1977. Their mission is to function as "a repository of resource materials, an information bank, that deals with a liaison known as a Health Education Coordinator (HEC) appointed at every medical facility" (17).

The Health Education Coordinator's duties include, determining what health education is being conducted at the base, assessing needs for future health education programs, and planning and coordinating all health education at their base (17). The HEC may request resource materials from the Health Education Division to aid in conducting programs. The Health Education Division also offers guidance and consultation to the HEC to develop individualized programs.

In February 1981, the Air Force Health Education Program moved from the School of Health Care Sciences at Sheppard Air Force Base, Texas to become a division in the Air Force Medical Service Center at Brooks Air Force Base, Texas. This move was designed to allow better consultation and support from the Chief of Professional Services Office at the Center (18). Their mission remained essentially the same.

In June 1985, the Health Education Division changed its name to the Health Promotion Program and the Health Education Coordinators became Health Promotion Coordinators (19). The stated mission of the Health Promotion Program is:

> to promote enhancement of personal performance within the Air Force community. This is achieved by individuals accepting responsibility for personal health maintenance and practicing healthy lifestyle behaviors. The mission responsibility is to facilitate an environment whereby individuals can acquire knowledge and skills that promote these behaviors (19).

Wright-Patterson Air Force Base Health Promotions. Wright-Patterson Air Force Base has a very active health promotion program. The position of Health Promotion Coordinator (HPC) at Wright-Patterson is typically held by a registered nurse assigned to the base hospital with other duties generally in an administrative role. The HPC orchestrates the efforts of the health promotion committee made up of 13 individuals from the medical field and 7 volunteers from each of the major organizations represented on the base. The committee provides a focal point to the HPC in each organization to aid in promoting health at the organizational level.

The emphasis of base health promotion programs are directed by the Surgeon General of the Air Force, Lieutenant General Murphy A. Chesney, in the form of a wellness calendar. A letter from the Surgeon General of the Air Force to all base HPC's dated 5 March 1986 spells out the current program. The letter calls for a 2 year campaign designated

the "Well Aware" program to begin in April 1986. The wellness calendar denotes the areas to be emphasized during each quarter through March 1988. For example, the health promotions committee will focus on physical fitness during the quarter beginning in July 1986 and ending in September 1986. Media packages are distributed to all HPC's by the Health Promotion Program Office at Brooks AFB, Texas which in turn are passed on to the base health promotion committee members. Specifics as to how the campaigns are actually conducted varies depending on the needs of the local Air Force community and resources available and is left up to each HPC and their committees.

Some of the programs currently in place at Wright-Patterson Air Force Base include:

1. Healthy Heart Program - identifies foods which are low in sodium, cholesterol, saturated fats, and calories on commissary shelves
2. Walking for Fitness Courses
3. Outpatient Eating Disorders Program
4. Prepared Childbirth Classes
5. Smoking Cessation Class
6. Vita Stat Wellness Centers - a small area equipped with automatic blood pressure measurement equipment, scales, and health promotion literature
7. Foreign Technology Division noontime lectures on various topics
8. Air Force Institute of Technology Stress Management Class held biannually
9. Patient Education Videotapes - shown in pharmacy waiting area

One of the few Air Force wide programs is the Coronary Artery Risk Evaluation (CARE) program. The CARE program involves an evaluation of the individuals susceptibility to heart disease based on a questionnaire and an examination by the flight surgeon.

The health promotions program at Wright-Patterson Air Force Base is extensive and addresses a variety of health topics.

Behavioral Studies. The foundation of the health promotions field lies in the belief that the behavioral intervention is linked to a more favorable health status. R. Kaplan suggests there are four assumptions which must be made for this link to exist. The assumptions are

> 1) that specific behaviors create risks for serious illness, 2) that changes in risk factors cause changes in health status, 3) that behavior can be easily changed, and 4) that behavior programs are cost effective (11:757).

The research which most strongly supports these assumptions are studies of behavioral change programs.

Perhaps the most successful behavioral change program to date is the Stanford Disease Prevention Program which took place from 1972 to 1975 (11:760-761). Subjects at high risk for cardiovascular disease from three comparable California communities participated in the study. The combination of an extensive mass media campaign and face-to-face instruction was given to a sample of people from Watsonville, California. Media only was provided to a group from Watsonville and a second group from Gilroy, California. Another group in Tracy, California acted as the control and received no intervention (20:130). The researchers hypothesized

> that intensive instruction, or media plus face-to-face intervention, would induce greater change in

> cardiovascular disease risk and related knowledge and behavior than would the media-only treatment or the control (20:130).

The results suggested changes in knowledge as a result of the intensive media campaign in Gilroy. Larger gains in knowledge were evident in Watsonville with the media campaign and intensive instruction. There was only a small but statistically significant effect for changes in cardiovascular health risk scores (11:761). This study supports the notion that a health promotion program can be influential in changing behavior.

In 1970, another well-known study was conducted by the National Heart, Lung, and Blood Institute. At a cost of $115 million, the Multiple Risk Factor Intervention Trail (MRFIT) yielded inconclusive results (11:759). The study compared groups given and not given counseling to reduce cardiac risk factors. The intervention group experienced a 7.1 per cent drop in coronary mortality after long-term follow-up of the 1970-1973 trials (10:649). The control group lowered their mortality rate 41 per cent below anticipated rates since their physicians were informed of their "high risk" status.

The effects of the media, instruction, and other health promotions techniques are difficult to measure scientifically. Those studies which focus on the perceptions of the individual seem to yield as much useful information as the scientific studies to date.

Summary

Effecting changes in the health practices of the United States population is a challenge being met by many diverse forces. The Air Force military population is similarly targeted for large improvement in all health related areas by internal health promotion programs along with the health promotion activities found in all other areas of our daily lives.

This chapter defined the problem and provided background into the work that has been done in the health promotions area. Chapter II describes the methodology used to conduct the study and Chapter III provides the research results. The final chapter, Chapter IV, discusses the significance of the findings and provides recommendations for further research.

II. Methodology

Overview

This chapter describes the methodology used to collect the required data to answer the research questions generated in Chapter I. The first section discusses the measures of physical health that are used in the study. Then, the survey method and instrument used to collect the necessary data is justified and discussed. Next, the target population and the related sample are described and justified. The final two sections discuss the statistical tests used in the analysis and note the assumptions and limitations of this study methodology.

Development of Physical Health Measures

Based on the literature review, the seven health practices identified by Belloc and Breslow (2) in their 1972 study will be used to indicated the physical health status of the population. The practices are body weight, eating breakfast, eating between meals, sleeping habits, smoking habits, alcohol consumption and exercise in leisure time.

Survey Instrument

General. Emory cites mail surveys, telephone interviews or personal interviews as possible options for collecting data of the nature required in this study (22:293). The advantages of a mail survey in this applica-

tion include 1) a large sample can be collected by a single person, 2) it is relatively fast since the base mail system can be used, 3) the respondent has no time pressure to force answers which have not been thought out, and 4) they are thought to be more impersonal causing the respondent to answer more freely.

The mail survey is not without disadvantages. Emory lists nonresponse bias as the most notable disadvantage (22:308). The researcher has little or no control over who will answer the survey. Another disadvantage is the lack of flexibility of a mail survey. The inability to get large volumes of data or to probe deeply into a particular area is difficult with a mail survey. Ambiguity when interpreting questions is a final problem which exists when using a mail survey instead of an interview technique.

Ensuring the survey is valid and reliable will help to control these disadvantages. Also, a number of precautions listed by Emory were used to facilitate a high response rate to negate the problem of nonresponse bias. The measures taken include keeping the survey length to a minimum, providing return envelopes, requiring no postage since the base mail system is used, including a cover letter with instructions for completion of the survey, maintaining anonymity, and ensuring a clear copy is sent to each respondent. The topic also serves to increase the response rate since it is a relatively popular subject.

The mail survey is judged the best method for collecting the desired data. The disadvantages of the mail survey have been minimized and are outweighed by its advantages.

Survey Structure. The survey addresses the current health practices of Air Force captains at Wright-Patterson, any changes in health practices experienced since coming on active duty, and the motivation for those changes. Survey results from a survey titled "Health Survey" conducted in 1977 by the Air Force Military Personnel Center are used for comparison to assess the changes in health practices of the Air Force captains since 1977. Detailed results of the 78 question survey were obtained from Dr. Harry P. Wetzler of the Department of Defense Medical Evaluation Review Board.

The survey involves 40 multiple choice questions designed to provide all inclusive responses. In situations where all possible responses can not be listed, a comment sheet is provided for written remarks. Nineteen questions are taken from the MPC survey conducted in 1977 for direct comparison between health practices of captains in 1977 and those of captains today. The primary purpose of the remaining 21 questions is to assess reasons for changes in health practices (See Appendix A).

Population and Sampling

The target population includes all Air Force captains permanently assigned to Wright-Patterson Air Force Base,

Ohio. The size of the population is estimated to be 2516 based on figures provided by the ATLAS data base.

The rank of captain was selected for several reasons. The primary reason is its large population size relative to the other ranks. There are over twice as many captains at Wright-Patterson Air Force Base as any other officer rank and 80% more than the largest enlisted rank represented (E-5). Another reason for using captains is that they all have at least 4 years of active service to ensure they have been exposed to the Air Force health promotions movement. Finally, the researcher's general perception that this group is in close touch with the fitness and health movement of the 1980's is considered important.

Distribution

The data was gathered from questionnaires completed by a probability sample of 514 captains stationed at Wright-Patterson Air Force Base. The Atlas data base provides a probability sample based on the last digit of the individuals social security account number.

An estimate sample size of 334 is required to capture the true population mean with a confidence level of 95% ± 5% (21). Based on an estimated 65% response rate, 514 surveys will be sent out for an expected return of 334 completed surveys.

The surveys were mailed on 6 June 1986 with a 10 day suspense. Cut-off for data collection was 7 July 1986.

Statistical Test

The Komolgorov-Smirnov (K-S) two sample test is used to test each of the seven health practices for statistically significant differences from the 1977 data. The K-S test is a nonparametric test based on the difference between the two cumulative frequencies. The assumptions that must be met to perform this test are that the two samples are independent and the data is measured on at least an ordinal scale (23:250). It is used in this case since the two previously mentioned assumptions are met. The data are drawn independently from different populations, and are either ordinal scale or interval scale grouped such that they are of an ordinal nature (24:2). Emory states that nonparametric tests, such as the K-S test, are the only technically correct tests to use with ordinal data (22:413). It should be noted, however, the test is exact if the data are continuous and is conservative for discrete populations (23:255).

The two-tailed test is used to detect any kind of difference in the distributions including central tendency, dispersion and skewness (25:127). A one-tailed test is used to determine whether the values of one distribution are generally larger than the values of the other distribution (25:127). In this study, a two-tailed test is used to detect a statistically significant difference, and a one-tailed test shows which population is generally larger.

An alternative to the K-S two sample test is the Chi square two sample test. The Chi square test is not used since "with ordinal data, the K-S test seems to make better use of the available information" (23:253).

Descriptive statistics will also be used where appropriate. This information will be generated using the crosstabs subprogram of the Statistical Package for the Social Sciences (SPSS^{x})(26:337-352).

Assumptions and Limitations

Assumptions. Several assumptions are made in conducting this research project. Some of the most important assumptions are:

1. Each respondent answers honestly and considers each question carefully.
2. The survey instrument is valid and reliable. The survey is valid since it measures what is designed to measure and reliable since consistent responses are obtained.
3. The survey and results obtained from the 1977 survey are valid and reliable. Dr. Harry Wetzler has maintained the data to ensure its accuracy and consistency.
4. The measures of physical health status provided by Belloc and Breslow are appropriate. The literature review supports this assumption.
5. The data collected in 1977 from the entire Air Force population accurately reflects the population of captains at Wright-Patterson Air Force Base in 1977.

Limitations. This research is limited due to its scope and design. Some of the major limitations are:

1. The conclusions reached only apply to the target

population. No statistical inferences can be drawn for the entire Air Force or other similar groups.

2. The interpretation and categorization of the comments are performed by the researcher.

3. Perceptions of ones own health do not always reflect accurately the respondents actual health status.

This chapter discussed the methodology used in collecting the required data. The next chapter, Chapter III, analyzes and presents the data gathered from the survey responses.

III. Findings and Analysis

General

The purpose of this chapter is to perform tests of hypotheses using the Komolgorov-Smirnov (K-S) test and describe the findings of the survey. The investigative questions proposed in Chapter I are given special emphasis. Statistical tests are computed by hand while the correlation and descriptive statistics are generated by SPSS^{x}.

Survey Description

The survey attempts to establish the current physical health practices of the target population in seven areas in a manner identical to that used in the 1977 MPC survey.

The categories selected as possible responses in each question were chosen to mirror the 1977 survey responses. The responses do not capture the true ratio scale data, but identical categories are required for easy comparison with the K-S two sample test.

The following paragraphs give a brief description of the survey and the intent of each section. A copy of the survey is contained in Appendix A.

Questions 1-6 - General Data - This section contains questions about length of service, age, sex, overall health, and the respondents last physical examination. The demographic data is used to demonstrate the similarity of the two samples.

Question 7 - CARE Program - Question 7 determines the respondent's familiarity with the Air Force's Coronary Artery Risk Evaluation (CARE) program.

Questions 8-14 - Weight - This series of questions asks for height and weight, status in the Air Force Weight Management Program, and how much the respondent's weight has changed since entering active duty. Additionally, for those who have lost weight, reasons and methods for the loss are requested.

Questions 15-16 - General Nutrition - Relative knowledge of nutrition and how often proper nutrition is provided by the diet are the topics of these two questions.

Questions 17-19 - Eating Breakfast - These questions determine breakfast eating habits and reasons for improvements in those habits.

Question 20 - Health Club Membership - Question 20 asks whether the respondent is a paying member of a commercial health club of some type.

Questions 21-23 - Snacking - This series of questions establishes current snacking habits and asks how and why those habits have changed since entering the Air Force.

Questions 24-26 - Sleep - These questions try to determine how much a person sleeps each night and how sleep habits have changed. Reasons a person may sleep more are also addressed.

Questions 27-30 - Smoking - These questions focus on how much, if any, the respondent smokes cigarettes. Whether a person has quit and reasons for quitting are also addressed. Question 30 establishes the level of familiarity with the smoking cessation classes offered on base.

Questions 31-33 - Alcohol - These questions determine the amount of alcohol consumed in a typical sitting and how this compares to the respondent's drinking habits when he/she came on active duty. The reason for drinking alcohol less is also addressed.

Questions 34-39 - Exercise - This series of questions asks how frequently one participates in both strenuous and non-strenuous physical activities. For the purposes of this study, strenuous exercises are those activities which require extensive effort. Examples include running, swimming, calisthenics and racquetball. Non-strenuous activities are those which require much less effort like table tennis, golf and bowling. This section also addresses the level of exercise compared to when the respondent entered active duty and reasons for exercising more. Question 36 asks how many pieces of home exercise equipment were purchase in the last year. This parameter may indicate whether exercise is becoming a bigger part of home life.

Questions 40 - Information Source - The final question attempts to determine the primary source of health related information.

Recordings of Findings

A complete summary of the survey results is presented in Appendix B. The number of respondents or counts for each response is given along with the percentage of total responses. For questions which are included in both the 1977 and 1986 surveys, the 1977 data is placed to the right of the 1986 data. A summary of the comments provided in cases where the "other" response is chosen are listed in Appendix C.

Demographic Results. The demographic information collected in the survey is used to demonstrate similarity between the two samples. The most significant difference between the samples is the presence of nearly three times as many females in the 1986 sample as in the 1977 sample. The effect is seen in both the mean height and weight. Weighting the mean height and weight of men and women in the 1986 sample by the proportions of men and women in the 1977 sample shows the similarity in the samples. The increase in service time and age may be explained by the larger number of prior enlisted personnel being commissioned as officers. Table I summarizes the demographic information.

Statistical Tests of Health Practices. The questions concerning each of the seven significant health practices which are contained in both the 1977 survey and this research survey are tested for statistically significant changes.

TABLE I

Demographic Data

Attribute	1986	1977
Sex (per cent of total)		
Male	84.7	94.6
Female	15.3	5.4
Age (years)		
Mean	31.8	30.9
Median	31.2	30.6
Active Military Service (years)		
Mean	8.7	8.1
Median	8.6 *	8.1
Mean Height (inches)		
Overall	69.7	70.5
Male	70.6	
Female	64.6	
Weighted by 1977 proportion	70.3	
Mean Weight (pounds)		
Overall	167.2	172.1
Male	173.9	
Female	130.3	
Weighted by 1977 proportion	171.5	

* The 1977 and 1986 samples showed 71 and 70 captains over 12 years of service respectively. The median for the 1986 sample is calculated using the distribution of the 1977 sample for data points over 12 years.

First a two-tailed test of significance is conducted to determine if a difference exists. Then, if a significant difference is noted, a one-tailed test is conducted to reflect the direction of the change. The symbols used in the test are summarized in Table II below.

TABLE II

Definition of K-S Test Symbols

Symbol	Definition
F	Cumulative probability distribution
G	Cumulative observed frequencies
N	Sample size
S	Empirical distribution function or the quantity G/N
D	Maximum absolute difference between the empirical distribution functions. Used for two-tailed test with alternative hypothesis $F_1 \neq F_2$. Given by the quantity: maximum $\lvert S_1 - S_2 \rvert$
D+	Maximum difference between the empirical distribution functions. Used for one-tailed test with alternative hypothesis $F_1 > F_2$. Given by the quantity: maximum $[S_1 - S_2]$
D-	Maximum difference between the empirical distribution functions. Used for one-tailed test with alternative hypothesis $F_1 < F_2$. Given by the quantity: maximum $[S_2 - S_1]$
D_c	Critical value or Komolgorov-Smirnov test statistic

To demonstrate the calculations involved in performing the Komolgorov-Smirnov (K-S) two-sample test, a hypothesis test of survey question 24 is performed.

Question 24 - Sleep Habits

Null Hypothesis: (H_0) $F_1 = F_2$

Wright-Patterson AFB captains in 1986 sleep equally as long each night as captains in 1977.

Alternative Hypothesis: (H_a) $F_1 \neq F_2$

Wright-Patterson AFB captains in 1986 sleep a different amount each night than captains in 1977.

Probability of type I error (alpha) is .05.

Test Statistic = D

where D is the maximum absolute difference between the empirical distribution functions of the two samples.

The 1986 sample data is denoted sample 1 since it is the smaller of the two. G_1 and G_2 are the cumulative counts for each sample, and S_1 and S_2 represent the quantities G_1/N_1 and G_2/N_2 respectively. N_1 is the sample size of the smaller sample (1986), and N_2 is the sample size of the larger sample (1977). Table III shows the tabular calculations for the K-S two sample test.

TABLE III

Sample Two-tailed K-S Test Calculations (Question 24)

Response	1986	1977	G_1	G_2	S_1	S_2	$S_1 - S_2$
10 or more	1	1	1	1	.003	.002	.001
9 - 10	3	18	4	19	.012	.037	-.025
7 - 8	216	397	220	416	.675	.808	-.133
5 - 6	103	99	323	515	.991	1.000	-.009
4 or less	3	0	326	515	1.000	1.000	.000

Test Statistic = .133

For alpha = .05, the critical value (D_c) for large samples (greater than 40) is

$$D_c = 1.36\sqrt{\frac{N_1 + N_2}{(N_1)(N_2)}} = 1.36\sqrt{\frac{326 + 515}{(326)(515)}} = .096$$

(22:515)

Since .133 is greater than .096, reject Ho at the alpha = .05 level. This means a statistically significant difference between the sleeping habits of captains in 1986 and captains in 1977 exists.

Results of two-tailed tests conducted to detect differences between 1977 and 1986 data for the 7 health practices are summarized in Table IV.

TABLE IV

Summary of Two-tailed K-S Tests for Health Practices

Health Practice	max |D|	D_c	Decision
Weight Gain	.123	.096	Reject H_0
Breakfast Habits	.085	.096	Do Not Reject H_0
Snacking Habits	.084	.096	Do Not Reject H_0
Sleep Habits	.133	.096	Reject H_0
Smoking Habits	.115	.096	Reject H_0
Alcohol Consumption	.164	.096	Reject H_0
Exercise Habits			
Strenuous	.109	.096	Reject H_0
Non-strenuous	.068	.096	Do Not Reject H_0

The summary of K-S tests reveals that a statistically significant difference between 1986 and 1977 data exists for the amount of weight gained, sleep habits, smoking habits, alcohol consumption and strenuous exercise habits. No statistically significant difference exists for breakfast eating habits, snacking habits or non-strenuous exercise habits.

A K-S one-tailed test on the variables showing a significant difference reveal the direction of the difference. Sample calculations for the one-tailed test are presented below.

Question 24 - Sleep Habits

Null Hypothesis: (H_0) $F_1 = F_2$

Wright-Patterson AFB captains in 1986 and 1977 get equally as much sleep each night.

Alternative Hypothesis: (H_a) $F_1 > F_2$

Wright-Patterson AFB captains in 1986 get more sleep each night than captains in 1977.

Probability of type I error (alpha) is .05.

Test Statistic = D+

where D+ = maximum $[S_1 - S_2]$. If the alternative hypothesis were that captains in 1986 sleep less than captains in 1977, the test statistic is D- = maximum $[S_2 - S_1]$.

It should be noted that the responses are listed and consequently accumulated from the largest values (10 or more hours of sleep) to the smallest values (4 or less hours). This is required since our alternative hypothesis states

that the 1986 data reflect more responses of the larger values and fewer of the smaller values. Therefore, whichever sample accumulates faster will represent longer periods of sleep rather than shorter periods.

TABLE V

Sample One-tailed K-S Test Calculations (Question 24)

Response	1986	1977	G_1	G_2	S_1	S_2	$S_1 - S_2$
10 or more	1	1	1	1	.003	.002	.001
9 - 10	3	18	4	19	.012	.037	-.025
7 - 8	216	397	220	416	.675	.808	-.133
5 - 6	103	99	323	515	.991	1.000	-.009
4 or less	3	0	326	515	1.000	1.000	.000

Test Statistic = .001

For alpha = .05, the critical value (D_c) for large samples (greater than 40) is

$$D_c = 1.22\sqrt{\frac{N_1 + N_2}{(N_1)N_2)}} = 1.22\sqrt{\frac{326 + 515}{(326)(515)}} = .086$$

(27:401)

Since .001 is less than .086, do not reject H_0 at the alpha = .05 level. This means that the captains surveyed in 1986 do not sleep generally longer than those surveyed in 1977. On the contrary, a one-tailed test in the opposite direction reveals captain in 1977 sleep generally longer.

Table VI summarizes the one-tailed tests to show the direction of the changes. The alternative hypothesis in all

cases represent a favorable change from the 1977 to the 1986 sample.

TABLE VI

Summary of One-tailed K-S Tests for Health Practices

Health Practice	H_a	D	D_c	Decision
Weight Gain	$F_1 < F_2$	.013	.086	Do Not Reject H_0
Sleep Habits	$F_1 > F_2$	.001	.086	Do Not Reject H_0
Smoking Habits	$F_1 < F_2$	.115	.086	Reject H_0
Alcohol Consumption	$F_1 < F_2$	.164	.086	Reject H_0
Exercise Habits (Strenuous)	$F_1 > F_2$	.109	.086	Reject H_0

The inferences that can be drawn from the statistical tests presented in this section are:

1) Three favorable changes in the physical health practices of Wright-Patterson Air Force Base captains since 1977. In general, they smoke less, drink less alcohol, and participate in strenuous exercise more frequently.

2) On the negative side, captains of today appear to have generally gained more weight since coming on active duty and get less sleep than their 1977 equivalent.

3) Finally, the frequency with which the 1986 sample eat breakfast, snack between meals and participate in non-strenuous exercise has not changed from 1977 levels.

Other Statistical Tests. In addition to testing for significant changes among the seven health practices, tests

are also performed on other questions of interest. Table VII summarizes the results of the tests.

TABLE VII

Summary of Two-tailed K-S Tests for Other Questions of Interest

Question	max |D|	D_c	Decision
Personal Health Rating	.131	.096	Reject H_0
Nutrition Knowledge Rating	.134	.096	Reject H_0
Frequency of Proper Nutrition in Diet	.031	.096	Do Not Reject H_0

These tests suggest there is a statistically significant difference between the 1986 and 1977 samples for how they rated their own overall health and their knowledge of nutrition. Also, no statistically significant difference exists in the frequency in which the respondents felt they got proper nutrition in their diet.

Table VIII below shows the one-tailed K-S test results to reflect the direction of the difference.

TABLE VIII

Summary of One-tailed K-S Tests for Other Questions of Interest

Question	H_a	D	D_c	Decision
Personal Health Rating	$F_1 > F_2$	.002	.086	Do Not Reject H_0
Nutrition Knowledge Rating	$F_1 > F_2$	.134	.086	Reject H_0

These statistical tests infer that captains at Wright-Patterson AFB in 1986 feel their overall health is generally worse and their knowledge of nutrition is generally better than captains in 1977. Finally, captains in 1986 and 1977 feel they get proper nutrition equally often in their diets.

Descriptive Analysis. This section provides a narrative of the remainder of the findings. The focus is on the current health practices of the sample in each of the seven health practice categories, positive changes in those practices since entering active duty and the reasons for those positive changes. Limited discussion of associations between select variables is provided within each health practice category. A table summarizing associations between variables with the 15 highest values of gamma are listed in Appendix D. Gamma is used as the measure of association in this study since it is appropriate for ordinal variables and it is thought to be superior to measures bases on the Chi square statistic (24:25). Gamma ranges from -1 for a perfect negative association to +1 for a perfect positive association between two variables.

Weight. The amount of weight a respondent has gained since entering active duty is used as a measure of comparison between tne 1986 and 1977 samples. 51.9% of the 1986 sample said they have gained 6 pounds or more since entering active duty. This compares to 39.2% from the 1977 sample.

Of the 9.5% of the 1986 sample who reported losing weight, 46.2% listed health as the reason for doing so. The method of weight loss listed by 37.2% of the respondents who lost weight is either starting or increasing exercise. The number two reason given by 29.3% of the respondents was eating less.

Overall, 3.1% of the sample said they are enrolled in the Weight Management Program (WMP). The breakdown by sex shows 6% of the women versus 2.5% of the men surveyed make up the 3.1%.

Breakfast. 47% of those survey report they eat breakfast everyday or almost everyday while 8% responded they rarely or never ate breakfast. This distribution is very similar to the 1977 distribution.

15.6% said they ate breakfast more often than when they entered active duty, while 24.2% said they ate it less often. The primary reason for eating breakfast more often was for health and was given by 45.6% of the sample.

Snacking. The level of snacking also very closely reflects levels recorded in 1977. 12.5% say they snack almost everyday while only 1.8% responded that they never snacked between meals.

31.8% said they snacked less often than when they came on active duty while only 13.5% reported snacking more frequently. The primary reason given for snacking less was to control weight.

Nutrition. Related to both breakfast habits and snacking is the notion of nutrition. Questions 15 and 16 address this topic and bring out some interesting results.

60.5% of the 1986 sample said their knowledge of nutrition was somewhat better or much better than average. Only 47.4% of the 1977 sample made that statement.

83.8% of the 1986 sample thought they usually or always got proper nutrition in their diet. 89.5% of the 1977 sample responded in a similar manner. The association between the frequency with which respondents eat breakfast and how often they get proper nutrition in their diet is moderately strong with a gamma of .51.

Sleep. The mean hours of sleep nightly for the 1986 sample is 6.9 hours compared to 7.2 hours for the 1977 sample. The mean is calculated using the midpoint of each interval as the value for that interval.

When asked how sleep habits had changed since entering active duty, 11.3% say they sleep more and 35.2% say they sleep less. Of the 11.3% who sleep more, the top three reasons given for sleeping more are 1) body needs more (36.4%), 2) change of job (25.0%), and 3) have more time (20.5%).

Smoking. A large difference in the level of smoking exists between the two samples. 74.9% of the 1986 sample have never smoked and 91.4% do not currently smoke when those who have quit are included. For the 1977 sample,

54.5% said they never smoked and 79.8% stated they did not smoke currently. Stated another way, 8.6% are smokers in 1986 compared to 20.1% smokers in 1977.

For the 1986 sample, 24.6% say they smoke more and 52.3% say they smoke less then when they entered active duty. Although no direct comparison can be made because of dissimilar time intervals, the 1977 group revealed that during their previous 12 months 12.9% smoked more and 34.1% smoked less. "For health" is the primary reason for quitting smoking. It was given over 5 times more frequently than the next most popular response.

A noticeable difference in percentage of smokers exists for differences in age. For those 30 years old or less, 2 of 144 respondents smoke cigarettes. For the over 30 group, 26 of 155 smoke cigarettes. That represents 1.4% smokers for the younger group to 16.8% smokers for the over 30 group. The gamma produced by cross-classification of age and smoking is .59. This is the strongest positive association discovered with the exception of obvious pairs such as height and weight (.65). In general, as age increases, the probability of being a smoker increases. The gamma for years of service and smoking is also relatively high as would be expected (.40).

From the 28 smokers identified in the survey, 11 are totally unfamiliar with Wright-Patterson's smoking cessation classes, 5 are vaguely familiar, 5 are somewhat familiar and

7 are very familiar. However, the amount a person smokes is positively associated with how familiar he/she is with the smoking cessation classes. Gamma for this association is .49.

Alcohol. The number of non-drinkers appears to have increased from 1977 levels. 17.1% of the 1986 sample said they do not drink alcohol. This compares to 12.2% of the 1977 sample. A more meaningful statistic is the decrease in those who have 5 or more drinks per sitting from 5.9% in 1977 to 2.4% in 1986.

36.7% said they drank less and 18.0% said they drank more than when they entered active duty. Reasons for drinking less are varied. 32.2% said they cut down for their health and 14.5% cut down because drinking alcohol has become less acceptable in society. The next most common responses are derived from comments made when the "other" response was chosen. Having less time available or fewer opportunities and religious convictions are the third and fourth most common reasons for not drinking as much alcohol.

Exercise. 72.5% of the 1986 sample report they participate in strenuous exercise once per week or more as opposed to 61.6% from the 1977 sample. The same measure for non-strenuous exercise is 37.0% and 42.2% for the 1986 and 1977 samples respectively.

37.3% said they exercised more and 41.0% said they exercised less than when they came on active duty.

The three most common reasons for exercising more are for health (31.7%), to lose weight (25.9%) and because they enjoy it (22.3%).

29.8% of the respondents reported buying at least one piece of home exercise equipment during the past year.

15.5% of the 1986 respondents said they are a paying member of a commercial fitness center, club or gym. This represents 13.9% of the men and 24.5% of the women. 22.0% of those who belong, say they participate in strenuous exercise almost everyday compared to 9.2% of those who do not belong to a commercial facility.

None of the 327 respondents reported ever being enrolled in the Fitness Improvement Training program.

CARE. The Coronary Artery Risk Evaluation (CARE) program is an Air Force wide program given special attention in this study. Data collected about the familiarity of the sample with the CARE program are summarized in this section.

Of the 33 respondents very familiar with the CARE program, 26 had their last physical within the last 12 months. This relationship is representative of the positive association between familiarity with CARE and timing of the last physical examination. Generally, the more recently the person has had a physical examination, the greater the familiarity with the CARE program. SPSS^{X} generates a gamma of .44 for these two variables.

16 of 31 who had minor health problems identified at their last physical are totally unfamiliar with CARE.

All 3 of the respondents with major problems identified at their last physical are somewhat familiar with the CARE program.

Summary

This chapter presented the results and findings of the research survey. Tests of hypotheses to identify statistically significant changes in the health practices of Wright-Patterson captains from 1977 levels are presented along with a narrative presentation of additional relevant information. The final chapter, Chapter IV, discusses the significance of the findings and provides recommendations for further research.

IV. Discussion and Recommendations

Significance of Results

The purpose of this research project was to measure seven physical health practices of Wright-Patterson AFB captains and test for positive changes, if any, in those practices from 1977 levels. Also, an attempt was made to bridge the gap between the Air Force's health promotions program and the positive changes in health practices.

Chapter III presented a detailed account of the results and findings of the data collection process. This section addresses each of the hypotheses made in Chapter I in terms of those results.

Hypothesis 1. The first objective of this study was to support the hypothesis that the physical health of the target population is improving and has showed significant improvements since the comprehensive health survey conducted in 1977. The hypothesis restated is:

> Significant positive changes in the physical health practices of Air Force personnel have occurred since the Air Force Military Personnel Center administered the 1977 Health Survey.

The support of this hypothesis lies in the comparisons made between the 1986 and 1977 samples for each of the seven health practices. Table IX shows the direction of change, if any, that occurred in the health practices as identified by the analysis in Chapter III.

TABLE IX

Changes in Physical Health Practices

Health Practice	Change
Weight gain	Negative
Breakfast	None
Snacking	None
Sleep	Negative
Smoking	Positive
Alcohol	Positive
Exercise	
Strenuous	Positive
Non-strenuous	None

Positive improvements in the health practices have been made in some very important areas. Cigarette smoking, alcohol consumption and participation in strenuous exercise are areas which can have very profound impact on daily life. A reduction from 20.1% smokers to 8.6% is an admirable change. Especially when it is compared to the 47% of the entire United States military that are believed to smoke based on a 1985 Department of Defense survey and the civilian rate which is roughly 30% (28:11).

While the number of non-drinkers has increased, what was more important is the corresponding decrease in the number of those who have 5 or more drinks per sitting or heavy drinkers. Belloc and Breslow showed a significant reduction in the level of health for those having 5 or more

drinks (heavy drinkers) while non-drinkers and moderate drinkers showed no reduction in health status (2:414). The decrease in heavy drinkers from 5.9% to 2.4% is very desirable and is complemented by an overall reduction in the amount of alcohol consumption as evidenced by the K-S test.

Negative changes are evident for the amount of weight gained and the quantity of sleep. The 18 minute decrease in the mean amount of sleep attained nightly is statistically significant, but how much affect this has on health in a practical sense is another question. Belloc and Breslow showed that more is better up to a point. Those getting 9 or more hours of sleep were less healthy than those getting 7 or 8 hours -- 8 being best (2:411-412). However, getting 6 or less hours was the least desirable of all options. The shift of the mean hours of sleep from 7.2 to 6.9 hours over the 9 year period is clearly a move away from the ideal.

With substantial attention given to weight standards in the Air Force today, it is somewhat surprising or counter-intuitive to have negative changes in the weight of Air Force captains. Although inherent flaws exist in using changes in weight to measure health status, it seems legitimate when used in a comparative situation. As one respondent noted, a significant change in weight was accompanied by a comparable increase in height. Therefore, he was not overweight. The assumption made is that this phenomenon presents itself equally for both samples and, consequently,

a direct comparison between the two samples is made. Wright-Patterson captains of 1986 have gained significantly more weight since coming on active duty than their 1977 equivalent.

No statistically significant changes are evident in the breakfast eating habits, snacking habits or participation in non-strenuous exercise. The support for breakfast and snacking as being associated with good health is somewhat weaker than for the other five areas. A change or lack of change in these two areas may warrant less concern than changes in the other areas.

In the final analysis, hypothesis 1 is met with mixed results. Positive changes have occurred in three physical health practices of Wright-Patterson AFB captains since 1977 while negative changes have occurred in two. The extent to which each of these health practices effects freedom from illness, quality of life and longevity is a critical question, but on the surface it seems some valuable progress is being made.

Hypothesis 2. The second objective of this study was to investigate the reasons for modifying health practices in a favorable manner and tie the Air Force health promotions program into that reasoning. Although this research does not show a causal relationship between Air Force health promotions and positive changes in health practices, it does attempt to highlight areas where health promotion may have had an impact. The hypothesis is:

The Air Force health promotions effort is a major force in promoting positive changes in health practices.

In addressing this hypothesis, a look at the reasons given for making positive changes and the areas of emphasis of the Air Force health promotions program may give some insight into the relationship between health promotion and the positive changes demonstrated in hypothesis 1.

For those who reported making positive changes in each of the seven health practices, Table X presents a summary of the primary reasons given for making those changes. The percentage of respondents making the primary response is also given.

TABLE X

Primary Reasons for Positive Changes in Health Practices

Positive Change	Primary Reason	% of Responses
Weight loss	Health	46.2
Breakfast more frequently	Health	45.6
Snacking less frequently	Weight control	56.3
Sleeping more	Body needs more	36.4
Smoking less	Health	66.7
Drink less alcohol	Health	32.2
Exercise more frequently	Health	31.7

In five of the seven categories, health was the primary reason for affecting a positive change. This suggests that

those making positive changes are aware of their own personal health and are taking responsibility for its maintenance. Also, they associate certain behaviors with better health. This simple yet important fact is the goal of health promotions. If the population has taken responsibility for maintenance of its health and realizes the benefits of healthy lifestyle behaviors, all that remains is to motivate each individual to make the positive changes.

Attention in the Air Force health promotions effort has been given to each of the seven categories used in this study. The emphasis closely paralleled the efforts of the civilian health promotions movement. Smoking, alcohol and drug abuse, weight control, exercise and proper nutrition are all important topics being addressed within the Air Force community.

A look at two of the formal Air Force health promotion programs may give some indication as to who is being reached by the effort. The smoking cessation class offered by the base medical facility is one such program. 17 of the 28 smokers or 60.7% had some knowledge of the smoking cessation classes which indicates a reasonably high although not perfect exposure to the smoking community. A report from administrators of the course reports a 66% success rate based on one year of classes (29:16). This is a commendable success rate although the data from this study do not sup-

port that figure. While 5 of the 28 smokers reported completing the course, none reported having quit smoking.

When questioned about the CARE program, 48.5% of the sample had some familiarity with the program. 91 of 327 or 27.9% reported having an evaluation. The CARE evaluation is "given as part of every complete flying or periodic physical exam at age 25" (30:22). It is very likely that many have had an evaluation and not known it since it is given during regular examinations. A substantial portion of the population is exposed to the smoking-cessation and CARE programs.

A final indicator of the ability of health promotions information to reach its target population is the source of health information. The top three sources of health information reported by the survey are 1) magazines (31.7%), 2) television and radio (18.3%) and 3) newspapers (9.3%). A more important figure is that only 13 of 327 or 4.0% said they did not receive any health information.

The nature of health promotions makes it difficult to effectively reach all of a population in much the same manner a commercial advertisement is not received by all who are targeted. The goal, however, is to reach as many members of the population as possible with the limited resources available. The Air Force health promotions program is making a significant contribution toward attaining that goal.

Health promotion is a marketing problem. Further, the characteristics of the market must be known before the market can be effectively attacked. It is hoped that this study may provide some useful information about the characteristics and trends of the health promotion "market". Progress is being made, but much work is left to be done in the struggle to overcome the inherent resistance to change and to motivate changes in unhealthy behavior.

Recommendations for Further Research

The opportunities for further research in the area of health promotions and health practices of Air Force personnel are numerous. This section outlines some of the directions that are related to this effort but should not be considered an all inclusive list. Substantial research is currently being done, but much more remains in the broad area of health promotions.

1. This effort is limited to captains at Wright-Patterson AFB. Expanding the study to include other grades or other geographic regions may be beneficial to investigate trends in other groups of interest.

2. Inclusion of Air Force civilian employees in research of this nature is desirable. Very little has been done to research the needs and desires of civilian employees to ensure the proper health promotion programs are conducted.

3. A study designed to highlight health status relative to age may be useful. For instance, the association evident in this study between smoking and age may reveal some useful information about age groups and should receive special attention from the health promotions community.

4. Unsolicited comments are present on many survey sheets concerning the issue of physical fitness testing. The fact that none of the 327 respondents have ever been enrolled in the Fitness Improvement Training program for failure to meet the 1.5 mile aerobics run standard provides support for much of the concern. Either captains at Wright-Patterson are all in satisfactory physical condition, or the system of testing is not serving its purpose. Investigation into the need for or conduct of this program may be justified.

Summary

Increased emphasis is being given to health promotion even at the highest levels of the military. A news release dated 11 March 1986 from the Office of the Assistant Secretary of Defense for Public Affairs stated,

> Secretary of Defense Caspar W. Weinberger today ordered put in place throughout the military a sweeping health promotion and education program focused on aggressive anti-smoking efforts, physical fitness, nutrition, alcohol and drug abuse, hypertension and stress management (31).

Carried out through the new Department of Defense Directive 1010.10 (32), this program greatly strengthens the Air Force health promotion effort.

As evidenced by this research, health promotion has helped to bring about significant positive changes in the smoking habits, exercise habits and alcohol consumption habits of Wright-Patterson AFB captains over the last 9 years. These positive changes are important to the Air Force and represent a significant increase in the ability of Air Force personnel to perform their duties. The negative changes, however, in weight gain and sleep habits seen

during the same period should serve as a reminder that more improvements are needed and continued support of the Air Force health promotions effort is essential at all levels.

The goal of developing a healthier workforce is a prime concern of U.S. military leaders. Pursuing this goal stands to significantly enhance the level of readiness of the Air Force and can most effectively be reached through a comprehensive health promotion program.

Appendix A: Physical Health Survey

USAF Survey Control No. 86-18, expires 23 May 87.

1. How much active military service have you completed?

   1. 4 years or less
   2. 4 years but less than 5 years
   3. 5 years but less than 6 years
   4. 6 years but less than 7 years
   5. 7 years but less than 8 years
   6. 8 years but less than 9 years
   7. 9 years but less than 10 years
   8. 10 years but less than 11 years
   9. 11 years but less than 12 years
   10. 12 years or more

2. What was your age on your last birthday?

   1. 24 years or less
   2. 25-26
   3. 27-28
   4. 29-30
   5. 31-32
   6. 33-34
   7. 35-36
   8. 37-38
   9. 39-40
   10. 41 or older

3. What is your sex?

   1. Male
   2. Female

4. How do you rate your overall health?

   1. Excellent
   2. Good
   3. Fair
   4. Poor
   5. Very Poor

5. When was your last physical examination?

   1. Less than 6 months ago
   2. Between 6 months and 12 months ago
   3. Between 12 months and 18 months ago
   4. Between 18 months and 2 years ago
   5. Between 2 years and 3 years ago
   6. Over 3 years ago
   7. Don't Know/Not Sure

6. What were the results of your last physical examination?

1. No health problems identified
2. Minor health problem(s) identified
3. Major health problem(s) identified
4. Don't Know/Not Sure

7. What is your familiarity with the Air Force's Coronary Artery Risk Evaluation (CARE) program?

1. Very familiar and have had an evaluation
2. Very familiar but have not had an evaluation
3. Somewhat familiar and have had an evaluation
4. Somewhat familiar but have not had an evaluation
5. Vaguely familiar and have had an evaluation
6. Vaguely familiar but have not had an evaluation
7. Totally unfamiliar with the CARE program

8. What is your height?

1. 4' 11" or less
2. 5' 0" - 5' 1"
3. 5' 2" - 5' 3"
4. 5' 4" - 5' 5"
5. 5' 6" - 5' 7"
6. 5' 8" - 5' 9"
7. 5' 10" - 5' 11'
8. 6' 0" - 6' 1"
9. 6' 2" - 6' 3"
10. 6' 4" or more

9. What is your weight?

1. 99 pounds or less
2. 100-109
3. 110-119
4. 120-129
5. 130-139
6. 140-149
7. 150-159
8. 160-169
9. 170-179
10. 180-189

10. Weight (continued)

1. 190-199
2. 200-209
3. 210-219
4. 220-229
5. 230-239
6. 240-249
7. 250 or more

11. How does your present weight compare to your weight when you entered the Air Force?

1. Now weigh less (at least 6 pounds less)
2. About the same (within 5 pounds)
3. Now weigh more by 6-15 pounds
4. Now weigh more by 16-25 pounds
5. Now weigh more by 26-35 pounds
6. Now weigh more by 36-45 pounds
7. Now weigh more by 46 pounds or more
8. Really can't remember

12. What is your current status concerning the Air Force Weight Management Program (WMP)? (WMP is an exercise program for those who do not meet maximum allowable weight standards)

1. Never been enrolled
2. Currently enrolled
3. Enrolled at one time, but not currently enrolled
4. Don't Know/Not Sure

13. If you have experienced a reduction in your body weight at any time while on active duty (5 pounds or more), what is the primary reason the change occurred?

1. Not Applicable; My weight has not changed or it has only increased
2. Doctor told me to
3. Family or friends encouraged me to
4. Did it for my health
5. Not due to any conscious effort on my part; it just happened
6. Don't Know/Not Sure
7. Other (specify on comment sheet)

14. If your weight loss was made through a conscious effort, what method did you primarily use to reduce your weight?

1. Not Applicable; My weight has not changed or it has increased
2. The Air Force Weight Management Program
3. Changed the type of foods I eat
4. Reduced the amount I eat
5. Changed the frequency or times I eat
6. Changed my exercise habits
7. Diet pills or commercial diet plan
8. Other (specify on comment sheet)

15. On the whole, how would you rate your knowledge of nutrition?

1. Much better than average
2. Somewhat better than average
3. About average
4. Somewhat worse than average
5. Much worse than average

16. Considering the types of foods you usually eat, how often would you say your diet provides you with proper nutrition?

1. Always
2. Usually
3. Occasionally
4. Seldom
5. Practically never
6. Don't Know/Not Sure

17. How often do you eat breakfast?

1. Every day or almost every day
2. Usually (3 or 4 days per week)
3. Occasionally (1 or 2 days per week)
4. Seldom (2 or 3 times per month)
5. Rarely or never (less than once a month)

18. How do your current breakfast eating habits compare to your habits when you entered the Air Force?

1. Eat breakfast now equally as often as I did then
2. Eat breakfast now more often than I did then
3. Eat breakfast now less often than I did then
4. Don't Know/Not Sure

19. If you eat breakfast more often now than at other times on active duty, what is the primary reason for the change?

1. Not Applicable; Breakfast eating habits have not change or I eat breakfast less often now
2. I have more time
3. Eating breakfast is more convenient now
4. Did it for my health
5. My appetite increased
6. Don't Know/Not Sure
7. Other (specify on comment sheet)

20. Are you currently a paying member of a commercial fitness center, health club, gym or comparable facility?

1. Yes
2. No

21. How often do you eat between meals?

1. Never
2. Rarely
3. Occasionally
4. Often
5. Almost every day

22. How do your current snacking habits compare to your snacking habits when you entered the Air Force?

1. Snack equally as often now as I did then
2. Snack more often now than I did then
3. Snack less often now than I did then
4. Don't Know/Not Sure

23. If you snack less often now than at other times on active duty, what is the primary reason for the change?

1. Not Applicable; Snacking habits have not changed or I snack more often now
2. My appetite has decreased
3. My doctor told me to
4. I have consciously cut down to control my weight
5. I have consciously cut down for other health reasons
6. Don't Know/Not Sure
7. Other (specify on comment sheet)

24. On the average, how many hours of sleep do you get each night?

1. 4 hours or less
2. 5-6 hours
3. 7-8 hours
4. 9-10 hours
5. More than 10 hours

25. How do your current sleeping habits compare to your sleeping habits when you entered the Air Force?

1. Sleep equally as long each night now as I did then
2. Sleep more now than I did then
3. Sleep less now than I did then
4. Don't Know/Not Sure

26. If you sleep longer each night now than at other times while on active duty, what is the primary reason for the change?

1. Not Applicable; Sleep habits have not changed or I sleep less now
2. My body needs more sleep now
3. I changed jobs
4. I have more time
5. I exercise more
6. Don't Know/Not Sure
7. Other (specify on comment sheet)

27. Do you smoke cigarettes?

1. No, I have never smoked cigarettes
2. No, I have smoked, but I quit
3. Yes, less than 1/2 pack per day
4. Yes, 1/2 to 1 pack per day
5. Yes, more than 1 pack per day

28. How do your current smoking habits compare to your smoking habits when you entered the Air Force?

1. Not applicable; I have never smoked cigarettes
2. Smoke the same now as I did then
3. Smoke more now than I did then
4. Smoke less now than I did then
5. Don't Know/Not Sure

29. If you quit smoking cigarettes, what is the main reason you quit?

1. Not applicable; Have never smoked or have not quit
2. My doctor told me to
3. My family of friends encouraged me to
4. I did it for my health
5. It was too expensive
6. Other (specify on comment sheet)

30. How familiar are you with Wright-Patterson's on-going smoking cessation classes?

1. Very familiar and have completed the course
2. Very familiar but have not completed the course
3. Somewhat familiar with the course
4. Vaguely familiar with the course
5. Totally unfamiliar with the course

31. When you drink alcoholic beverages, how many drinks do you usually have? (1 drink = 12 oz. of beer, 8 oz. of wine, 1 oz. of 80 proof liquor or a comparable amount of alcohol)

1. Not applicable; I do not drink alcohol
2. 1 or 2 drinks
3. 3 or 4 drinks
4. 5 or 6 drinks
5. 7 or more drinks

32. How does your current alcohol consumption compare to your alcohol consumption when you entered the Air Force?

1. Drink the same now as I did then
2. Drink more now than I did then
3. Drink less now than I did then
4. Don't Know/Not Sure

33. If you drink less now than at other times on active duty, what is the primary reason you cut down?

1. Not Applicable; I drink the same or more now
2. My doctor told me to
3. My family of friends encouraged me to
4. I did it for my health
5. It was too expensive
6. It is less acceptable in society today
7. Other (specify on comment sheet)

34. How often do you participate in forms of exercise that require strenuous physical activity? (For example: running, calisthenics, weight lifting, racquetball, etc.)

1. Almost every day
2. About 4-5 times per week
3. About 1-3 time per week
4. About 1-3 times per month
5. Less than once a month
6. Never or very rarely

35. How often do you participate in forms of exercise that do not require strenuous physical activity? (For example: table tennis, golf, bowling, etc.)

1. Almost every day
2. About 4-5 times per week
3. About 1-3 time per week
4. About 1-3 times per month
5. Less than once a month
6. Never or very rarely

36. How many pieces of home exercise equipment have you purchased in the last 12 months? (For example: rowing machine, weights, exercise bicycle, etc.)

1. 1
2. 2
3. 3
4. 4 or more
5. 0; Have not bought any

37. What is your current status concerning the Air Force's Fitness Improvement Training (FIT)? (FIT is an exercise program for those who do not meet aerobics run/walk standards)

1. Never been enrolled
2. Currently enrolled
3. Enrolled at one time, but not currently enrolled
4. Don't Know/Not Sure

38. How does your current level of exercise compare to your level of exercise when you entered the Air Force?

1. Exercise the same now as I did then
2. Exercise more now than I did then
3. Exercise less now than I did then
4. Don't Know/Not Sure

39. If you exercise more now than at other times while on active duty, what is the primary reason you increased your level of exercise?

1. Not Applicable; I exercise the same or less now
2. My doctor told me to
3. My family of friends encouraged me to
4. I did it for my health
5. I did it to lose weight
6. I enjoy it
7. I have more time
8. It is more convenient to exercise now
9. Other (specify on comment sheet)
10. Don't Know/Not Sure

40. Which of the following is the main source of health related information you receive?

1. Television/Radio
2. Newspaper
3. Magazines
4. My friends
5. Pamphlets or brochures I pick up
6. My doctor/Base medical facility
7. Other(specify on comment sheet)
8. I do not receive any
9. Don't Know/Not Sure

COMMENT SHEET

13. Reason lost weight: _____

_____

14. Weight loss method: _____

_____

19. Reason eat breakfast more: _____

_____

23. Reason snack less: _____

_____

26. Reason sleep longer: _____

_____

29. Reason quit smoking: _____

_____

33. Reason drink less: _____

_____

39. Reason exercise more: _____

_____

40. Main source of information: _____

_____

Thank you for completing this survey.

Appendix B: Survey Response Frequencies

Percentages may not add to 100% due to rounding.

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q01 - YEARS ACTIVE MILITARY SERVICE COMPLETED				
less than 4 years	16	4.9	31	6.0
4 years, <5 years	24	7.3	64	12.4
5 years, <6 years	31	9.5	47	9.1
6 years, <7 years	30	9.2	64	12.4
7 years, <8 years	45	13.8	46	8.9
8 years, <9 years	30	9.2	54	10.5
9 years, <10 years	37	11.3	55	10.7
10 years, <11 years	22	6.7	59	11.4
11 years, <12 years	22	6.7	25	4.8
12 years or more	70	21.4	71	13.8
TOTAL RESPONSES	327	100.0	516	100.0
	327 VALID CASES 0 MISSING CASES		516 VALID CASES 1 MISSING CASES	
Q02 - AGE ON LAST BIRTHDAY				
24 or under	0	0.0	2	.4
25-26	18	5.5	41	8.0
27-28	57	17.4	97	18.9
29-30	71	21.7	114	22.2
31-32	54	16.5	105	20.4
33-34	44	13.5	91	17.7
35-36	31	9.5	29	5.6
37-38	31	9.5	21	4.1
39-40	14	4.3	10	1.9
41 and over	7	2.1	4	.8
TOTAL RESPONSES	327	100.0	514	100.0
	327 VALID CASES 0 MISSING CASES		514 VALID CASES 3 MISSING CASES	

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q03 - SEX				
Male	277	84.7	487	94.6
Female	50	15.3	28	5.4
TOTAL RESPONSES	327	100.0	515	100.0
	327 VALID CASES 0 MISSING CASES		515 VALID CASES 2 MISSING CASES	
Q04 - PERSONAL HEALTH RATING				
Excellent	163	50.0	326	63.1
Good	141	43.3	183	35.4
Fair	21	6.4	6	1.2
Poor	1	0.3	1	.2
Very Poor	0	0.0	1	.2
TOTAL RESPONSES	326	100.0	517	100.1
	326 VALID CASES 1 MISSING CASES		517 VALID CASES 0 MISSING CASES	
Q05 - LAST PHYSICAL EXAMINATION				
less than 6 Months Ago	55	16.9		
6-12 Months Ago	59	18.2		
12-18 Months Ago	44	13.5		
18 Months-2 Years Ago	46	14.2		
2-3 Years Ago	40	12.3		
over 3 Years Ago	77	23.7		
Don't Know	4	1.2		
TOTAL RESPONSES	325	100.0		
	325 VALID CASES 2 MISSING CASES			

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q06 - RESULTS OF LAST PHYSICAL EXAMINATION				
No Problems	290	88.7		
Minor Problems	31	9.5		
Major Problems	3	0.9		
Don't Know	3	0.9		
TOTAL RESPONSES	327	100.0		
	327 VALID CASES 0 MISSING CASES			
Q07 - FAMILIARITY WITH CARE PROGRAM				
Very Fam. w/ Eval.	35	10.7		
Very Fam. w/o Eval.	4	1.2		
Somewhat Fam. w/ Eval.	47	14.4		
Somewhat Fam. w/o Eval.	12	3.7		
Vaguely Fam. w/ Eval.	9	2.8		
Vaguely Fam. w/o Eval.	19	5.8		
Totally Unfam.	201	61.5		
TOTAL RESPONSES	327	100.0		
	327 VALID CASES 0 MISSING CASES			
Q08 - HEIGHT TO NEAREST INCH				
4'11 or less	0	0.0	1	.2
5'0-5'1	6	1.8	2	.4
5'2-5'3	11	3.4	4	.8
5'4-5'5	19	5.8	11	2.1
5'6-5'7	43	13.2	59	11.5
5'8-5'9	72	22.1	83	16.1
5'10-5'11	71	21.8	162	31.5
6'0-6'1	61	18.7	131	25.5
6'2-6'3	35	10.7	50	9.7
6'4 or more	8	2.5	11	2.2
TOTAL RESPONSES	326	100.0	514	100.0
	326 VALID CASES 1 MISSING CASES		514 VALID CASES 3 MISSING CASES	

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q09 & Q10 - WEIGHT IN POUNDS				
99 or less	1	0.3	1	.2
100-109	5	1.5	1	.2
110-119	8	2.5	4	.8
120-129	11	3.4	5	1.0
130-139	21	6.4	21	4.1
140-149	29	9.0	36	7.0
150-159	45	13.9	77	15.0
160-169	48	14.8	95	18.4
170-179	53	16.4	90	17.5
180-189	36	11.1	82	15.9
190-199	35	10.8	47	9.1
200-209	21	6.4	34	6.6
210-219	9	2.8	12	2.3
220-229	1	.3	5	1.0
230-239	0	0.0	3	.6
240-249	1	.3	2	.4
250 or more	0	0.0	0	0.0
TOTAL RESPONSES	324	99.9	515	100.1
	324 VALID CASES 3 MISSING CASES		515 VALID CASES 2 MISSING CASES	
Q11 - CHANGE IN WEIGHT SINCE ENTERING A.F.				
Less by at least 6 lbs	31	9.5	54	10.5
Same within 5 lbs	126	38.5	256	50.0
More by 6-15 lbs	107	32.7	122	23.8
More by 16-25 lbs	42	12.8	42	8.2
More by 26-35 lbs	12	3.7	27	5.3
More by 36-45 lbs	6	1.8	7	1.4
More by 46 lbs or more	2	0.6	4	.8
Can't Remember	1	0.3	0	0.0
TOTAL RESPONSES	327	100.0	512	100.0
	327 VALID CASES 0 MISSING CASES		512 VALID CASES 5 MISSING CASES	

1986 SURVEY

	COUNT	PCT OF RESPONSES
Q12 - STATUS WITH WEIGHT MANAGEMENT PROGRAM		
Never Enrolled	306	94.2
Currently Enrolled	10	3.1
Enrolled Once but Not Now	7	2.2
Don't Know	2	0.6
TOTAL RESPONSES	325	100.0

325 VALID CASES
2 MISSING CASES

Q13 - FOR THOSE THAT LOST WEIGHT, WHAT IS THE REASON?		
Doctor	3	1.5
Family or Friends	9	4.6
For Health	91	46.2
Just Happened	30	15.2
Don't Know	5	2.5
Other	59	29.9
TOTAL RESPONSES	197	99.9

197 VALID CASES
130 MISSING CASES

Q14 - FOR THOSE WHO LOST WEIGHT, WHAT IS THE METHOD USED?		
WMP	5	3.0
Change Type of Food	20	12.2
Eat Less	48	29.3
Changed Freq. or Times	4	2.4
Changed Exercise Habits	61	37.2
Diet Pills/Plan	5	3.0
Other	21	12.8
TOTAL RESPONSES	164	99.9

164 VALID CASES
163 MISSING CASES

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q15 - NUTRITION KNOWLEDGE RATING				
Much Better Than Avg.	89	27.2	81	15.7
Somewhat Better Than Avg	109	33.3	162	31.5
About Avg.	121	37.0	246	47.8
Somewhat Worse Than Avg.	8	2.4	20	3.9
Much Worse Than Avg.	0	0.0	6	1.2
TOTAL RESPONSES	327	100.0	515	100.1
	327 VALID CASES 0 MISSING CASES		515 VALID CASES 2 MISSING CASES	
Q16 - HOW OFTEN PROPER NUTRITION IN DIET?				
Always	54	16.5	69	13.3
Usually	220	67.3	394	76.2
Occasionally	44	13.5	41	7.9
Seldom	5	1.5	6	1.2
Practically Never	3	0.9	2	.4
Don't Know	1	0.3	5	1.0
TOTAL RESPONSES	327	100.0	517	100.0
	327 VALID CASES 0 MISSING CASES		517 VALID CASES 0 MISSING CASES	
Q17 - HOW OFTEN EAT BREAKFAST?				
Every Day or Almost	154	47.1	228	44.1
Usually	45	13.8	58	11.2
Occasionally	67	20.5	115	22.2
Seldom	35	10.7	79	15.3
Rarely or Never	26	8.0	37	7.2
TOTAL RESPONSES	327	100.0	517	100.0
	327 VALID CASES 0 MISSING CASES		517 VALID CASES 0 MISSING CASES	

1986 SURVEY

Q18 - CHANGE IN BREAKFAST HABITS SINCE ENTERING A.F.

	COUNT	PCT OF RESPONSES
Equally Often	192	58.7
More Often	51	15.6
Less Often	79	24.2
Don't Know	5	1.5
TOTAL RESPONSES	327	100.0

327 VALID CASES
0 MISSING CASES

Q19 - FOR THOSE WHO EAT BREAKFAST MORE, WHAT IS THE REASON?

More Time	6	10.5
More Convenient	7	12.3
For Health	26	45.6
Appetite Increased	3	5.3
Don't Know	5	8.8
Other	10	17.5
TOTAL RESPONSES	57	100.0

57 VALID CASES
270 MISSING CASES

Q20 - PAYING MEMBER OF FITNESS CENTER, CLUB, OR GYM?

Yes	50	15.5
No	272	84.5
TOTAL RESPONSES	322	100.0

322 VALID CASES
5 MISSING CASES

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q21 - HOW OFTEN EAT BETWEEN MEALS?				
Never	6	1.8	18	3.5
Rarely	72	22.0	149	28.8
Occasionally	145	44.3	229	44.3
Often	63	19.3	80	15.5
Almost Every Day	41	12.5	41	7.9
TOTAL RESPONSES	327	100.0	517	100.0
	327 VALID CASES 0 MISSING CASES		517 VALID CASES 0 MISSING CASES	

Q22 - CHANGE IN SNACKING HABITS SINCE ENTERING A.F.		
Equally Often	163	49.8
More Often	44	13.5
Less Often	104	31.8
Don't Know	16	4.9
TOTAL RESPONSES	327	100.0
	327 VALID CASES 0 MISSING CASES	

Q23 - FOR THOSE WHO SNACK LESS, WHAT IS THE REASON?		
Appetite Decreased	15	12.6
Doctor	3	2.5
Control Weight	67	56.3
Other Health Reasons	8	6.7
Don't Know	17	14.3
Other	9	7.6
TOTAL RESPONSES	119	100.0
	119 VALID CASES 208 MISSING CASES	

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q24 - HOW MUCH SLEEP?				
4 hours or less	3	0.9	0	0.0
5-6 hours	103	31.6	99	19.2
7-8 hours	216	66.3	397	77.1
9-10 hours	3	0.9	18	3.5
10 hours or more	1	0.3	1	.2
TOTAL RESPONSES	326	100.0	515	100.0
	326 VALID CASES 1 MISSING CASES		515 VALID CASES 2 MISSING CASES	

Q25 - CHANGE IN SLEEPING HABITS SINCE ENTERING A.F.		
Equally Long	169	51.7
Sleep More	37	11.3
Sleep Less	115	35.2
Don't Know	6	1.8
TOTAL RESPONSES	327	100.0
	327 VALID CASES 0 MISSING CASES	

Q26 - FOR THOSE WHO SLEEP LONGER, WHAT IS THE REASON?		
Body Needs More	16	36.4
Changed Jobs	11	25.0
More Time	9	20.5
Exercise More	3	6.8
Don't Know	4	9.1
Other	1	2.3
TOTAL RESPONSES	44	100.1
	44 VALID CASES 283 MISSING CASES	

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q27 - SMOKE CIGARETTES?				
Never Smoked	245	74.9	282	54.5
Smoked, But Quit	54	16.5	131	25.3
< 1/2 Pack Per Day	4	1.2	13	2.5
1/2 - 1 Pack Per Day	11	3.4	46	8.9
1 Pack Per Day or More	13	4.0	45	8.7
TOTAL RESPONSES	327	100.0	517	99.9
	327 VALID CASES 0 MISSING CASES		517 VALID CASES 0 MISSING CASES	
Q28 - FOR THOSE WHO SMOKE, HOW HAVE SMOKING HABITS CHANGED SINCE (86-ENTER A.F., 77-A YEAR AGO)				
Smoke the Same	13	20.0	70	53.0
Smoke More	16	24.6	17	12.9
Smoke Less	34	52.3	45	34.1
Don't Know	2	3.1	0	0.0
TOTAL RESPONSES	65	100.0	132	100.0
	65 VALID CASES 262 MISSING CASES		132 VALID CASES 385 MISSING CASES	
Q29 - FOR THOSE WHO QUIT SMOKING, WHAT IS THE REASON?				
Doctor told me to	0	0.0	0	0.0
Family and Friends	7	13.0	14	9.3
For Health	36	66.7	115	76.7
Too Expensive	3	5.6	7	4.7
Other	8	14.8	14	9.3
TOTAL RESPONSES	54	100.1	150	100.0
	54 VALID CASES 273 MISSING CASES		150 VALID CASES 367 MISSING CASES	

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q30 - FAMILIARITY WITH WPAFB SMOKING CESSATION CLASS				
Very Familiar/Completed	5	1.6		
Very Familiar/Not Com.	15	4.7		
Somewhat Familiar	24	7.5		
Vaguely Familiar	36	11.3		
Totally Unfamiliar	239	74.9		
TOTAL RESPONSES	319	100.0		
	319 VALID CASES 8 MISSING CASES			
Q31 - HOW MUCH ALCOHOL?				
Don't Drink	56	17.1	63	12.2
1 or 2	210	64.2	272	52.7
3 or 4	53	16.2	151	29.3
5 or 6	6	1.8	24	4.7
7 or more	2	0.6	6	1.2
TOTAL RESPONSES	327	100.0	516	100.1
	327 VALID CASES 0 MISSING CASES		516 VALID CASES 1 MISSING CASES	
Q32 - CHANGE IN DRINKING HABITS SINCE ENTERING A.F.				
Drink the Same	144	44.0		
Drink More	59	18.0		
Drink Less	120	36.7		
Don't Know	4	1.2		
TOTAL RESPONSES	327	100.0		
	327 VALID CASES 0 MISSING CASES			

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q33 - FOR THOSE WHO DRINK ALCOHOL LESS, WHAT IS THE REASON?				
Doctor	2	1.6		
For Health	40	32.2		
Too Expensive	4	3.2		
Less Accepted	18	14.5		
Other	60	48.4		
TOTAL RESPONSES	124	99.9		
	124 VALID CASES 203 MISSING CASES			
Q34 - HOW OFTEN PARTICIPATE IN STRENUOUS EXERCISE?				
Almost Every Day	37	11.3	52	10.1
4-5 Times/Week	67	20.5	72	14.0
1-3 Times/Week	133	40.7	193	37.5
1-3 Times/Month	45	13.8	100	19.4
Less than Once/Month	26	8.0	60	11.7
Never of Rarely	19	5.8	38	7.4
TOTAL RESPONSES	327	100.0	515	100.1
	327 VALID CASES 0 MISSING CASES		515 VALID CASES 2 MISSING CASES	
Q35 - HOW OFTEN PARTICIPATE IN NON-STRENUOUS EXERCISE?				
Almost Every Day	18	5.5	21	4.1
4-5 Times/Week	11	3.4	18	3.5
1-3 Times/Week	92	28.1	178	34.6
1-3 Times/Month	91	27.8	144	28.0
Less than Once/Month	53	16.2	91	17.7
Never of Rarely	62	19.0	63	12.2
TOTAL RESPONSES	327	100.0	515	100.1
	327 VALID CASES 0 MISSING CASES		515 VALID CASES 2 MISSING CASES	

1986 SURVEY

Q36 - PIECES OF HOME EXERCISE EQUIPMENT PURCHASED IN LAST YEAR

	COUNT	PCT OF RESPONSES
1	67	20.6
2	23	7.1
3	6	1.8
4 or More	1	0.3
0	228	70.2
TOTAL RESPONSES	325	100.0

325 VALID CASES
2 MISSING CASES

Q37 - STATUS CONCERNING THE FITNESS IMPROVEMENT TRAINING

Never Enrolled	325	99.4
Currently Enrolled	0	0.0
Enrolled Once, Not Now	0	0.0
Don't Know	2	0.6
TOTAL RESPONSES	327	100.0

327 VALID CASES
0 MISSING CASES

Q38 - CHANGE IN EXERCISE HABITS SINCE ENTERING A.F.

Exercise the Same	68	20.8
Exercise More	122	37.3
Exercise Less	134	41.0
Don't Know	3	0.9
TOTAL RESPONSES	327	100.0

327 VALID CASES
0 MISSING CASES

	1986 SURVEY		1977 SURVEY	
	COUNT	PCT OF RESPONSES	COUNT	PCT OF RESPONSES
Q39 - FOR THOSE WHO EXERCISE MORE, WHAT IS THE REASON?				
Family and Friends	1	0.7		
For Health	44	31.7		
Lose Weight	36	25.9		
Enjoy It	31	22.3		
More Time	8	5.8		
More Convenient	7	5.0		
Other	7	5.0		
Don't Know	5	3.6		
TOTAL RESPONSES	139	100.0		
	139 VALID CASES 188 MISSING CASES			
Q40 - PRIMARY SOURCE OF HEALTH INFORMATION				
TV/Radio	59	18.3	71	14.0
Newspaper	30	9.3	50	9.9
Magazines	102	31.7	151	29.8
Friends	15	4.7	14	2.8
Pamphlets/Brochures	16	5.0	39	7.7
Doctor/Med Facility	19	5.9	101	19.9
Other	41	12.7	62	12.2
Don't Receive Any	13	4.0	5	1.0
Don't Know	27	8.4	14	2.8
TOTAL RESPONSES	322	100.0	507	100.1
	322 VALID CASES 5 MISSING CASES		507 VALID CASES 10 MISSING CASES	

Appendix C: Summary of Survey Comments

Question 13 - The reason you lost weight.

Meet Air Force or other standard	13
Improve Appearance	13
Begin or Increase Exercise	10
Officer Training School or Basic Training	9
Hospitalized or Illness	6
Living in a Remote Area (bad food)	4
Stress	3
Post pregnancy	3
Exercised less	2
For Health Reasons	2
Survival School	1
Attended AFIT	1
Shift Work	1
Weight control	1
Children wear it off me	1
Poor eating habits when busy	1
Reduce cholesterol level	1
Clothes would not fit	1
Altered dietary habits	1

Question 14 - Weight loss method.

Exercise	22
Eat less	21
Eat different types of foods	7
Eat less frequently	3
Fasting	2
Changed jobs	1
Hospitalized for overworking	1
Survival training	1
Air Force diet plan (Medical Center)	1
Natural fluctuations	1
Diet pills	1
Officer Training School	1

Question 19 - Reason for eating breakfast more often.

Got married	4
Increased need as I get older	1
Better job performance	1
Boredom	1
Sweet tooth	1
So I can make lunch optional	1

Change from day to evening shift	1
Fuel to play golf at 0700	1

Question 23 - Reason for snacking less often.

Weight Control	4
Less time due to a high pressure job	4
Don't keep snacks around the house	2
Trying to get better nutrition	2
Snacks make me physically ill	1
Cut out simple sugars	1
Improve appearance	1
Less palatable snacks readily available	1
Self motivation	1
Got married	1
Stay within weight standards	1
Exercising more	1

Question 26 - Reason for sleeping longer.

Shift work	1
I'm pregnant now	1

Question 29 - Reason for quitting smoking.

Only smoked because of peer pressure	2
Healthier heart and lungs	2
Religious convictions	2
Pregnancy	1
Wife	1
Switched to cigars or pipes	1
Didn't like the taste	1
It got boring	1
Began to make me ill	1
Didn't feel like smoking anymore	1

Question 33 - Reason for drinking alcohol less.

Fewer opportunities or less time	13
Religious convictions	9
No longer have the desire	6
Got married	5
I'm older	5
Don't need or enjoy it	5
Weight control	4
Don't socialize as much	3
Lost its appeal	3
Out of college environment	3

It is unnecessary to socialize	3
Affected by alcoholism of family member	2
Just don't drink as much	1
I'm smarter now	1
Clouds capabilities for decision making	1
Appearance	1
Example for children	1
Penalties are more severe if caught	1
Don't want to be an alcoholic	1
Personal beliefs	1
Changed jobs	1
Less acceptable in society	1
Dangers of drunk driving	1
I'm more mature now	1
I'm breast feeding	1
Dangerous for your career	1
Don't like it	1
I'm a recovering alcoholic	1

Question 39 - Reason for exercising more.

Weight control	10
For my health	4
I enjoy it	4
I have more time	3
Stress management	3
Aerobics run requirement	2
Stay off fat boy program	1
Avoid knee surgery	1

Question 40 - Main source of health information.

I'm in a health related profession	17
Television	8
Books	7
Magazines	7
From my spouse	6
Pamphlets	6
Personal physician	5
Friends	5
Newspaper	4
Professional journals	3
Formal education (seminars and classes)	2
Life Extension Foundation membership	1
Seventh Day Adventist Church	1
Personal study	1
Dr. Red Duke	1
Encyclopedia	1
Unknown	1

Appendix D: Summary of Gamma Statistics

Gamma	Variable #1	Variable #2
.59	Age at last birthday	Amount of smoking
.51	Frequency of eating breakfast	Frequency of proper nutrition in diet
.49	Familiarity with smoking cessation class	Amount of smoking
.44	Familiarity with CARE program	Timing of last physical exam
.40	Years of service	Amount of smoking
.36	Sex	Paying member of health club
.34	Amount of strenuous exercise	Personal health rating
.32	Frequency of eating breakfast	Nutrition knowledge rating
.27	Amount of strenuous exercise	Amount of smoking
.26	Change in weight	Years of active duty
.26	Amount of smoking	Overall health rating
.25	Amount of strenuous exercise	Paying member of health club
.24	Frequency of eating breakfast	Overall health rating
.21	Years of service	Overall health rating
.21	Amount of strenuous exercise	Frequency of eating breakfast

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REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) AFIT/GLM/XPX/86S-34	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION School of Systems and Logistics 6b. OFFICE SYMBOL (If applicable) AFIT/LS	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (City, State and ZIP Code) Air Force Institute of Technology Wright-Patterson AFB, Ohio 45433-6583	7b. ADDRESS (City, State and ZIP Code)
8a. NAME OF FUNDING/SPONSORING ORGANIZATION 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State and ZIP Code)	10. SOURCE OF FUNDING NOS. PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT NO.
11. TITLE (Include Security Classification) See Box 19	
12. PERSONAL AUTHOR(S) Bret A. Hyde, B.S., Capt, USAF	
13a. TYPE OF REPORT MS Thesis 13b. TIME COVERED FROM _____ TO _____	14. DATE OF REPORT (Yr., Mo., Day) 1986 September 15. PAGE COUNT 90
16. SUPPLEMENTARY NOTATION	

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB. GR.	
06	05		Health, Health Surveys, Public Health, Preventive Medicine

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Title: A STUDY OF THE PHYSICAL HEALTH PRACTICES OF UNITED STATES AIR FORCE CAPTAINS

Approved for public release: IAW AFR 190-1.
29 Sept 86.
Dean for Research and Professional Development
Air Force Institute of Technology (AFIT)
Wright-Patterson AFB OH 45433

Thesis Advisor: William A. Mauer, GM-15
Professor of Econometrics/Associate Dean

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ OTIC USERS ☐	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL William A. Mauer, GM-15	22b. TELEPHONE NUMBER (Include Area Code) 513-255-6857 22c. OFFICE SYMBOL AFIT/LS

DD FORM 1473, 83 APR EDITION OF 1 JAN 73 IS OBSOLETE.

The purpose of this study is to investigate positive changes in the physical health practices of Wright-Patterson Air Force Base captains. Additionally, the reasons for those changes and their relationship to the Air Force health promotions program is investigated.

The study uses a survey to measure seven physical health practices of a probability sample of captains assigned to Wright-Patterson AFB for comparison to previously collected Air Force health data.

Significant positive changes occurred in the smoking habits, alcohol consumption and physical exercise habits of the sample. Negative changes were evident in the amount of weight gained since entering active duty and sleep habits. No change was present for frequency of eating breakfast or between meals.

Familiarity of the sample with the current health promotion programs such as the Coronary Artery Risk Evaluation (CARE) program and smoking cessation classes are discussed in terms of success in reaching the population and motivating positive changes in behavior. Also, the reasons given for making positive changes are investigated to show the effectiveness of the health promotions effort.